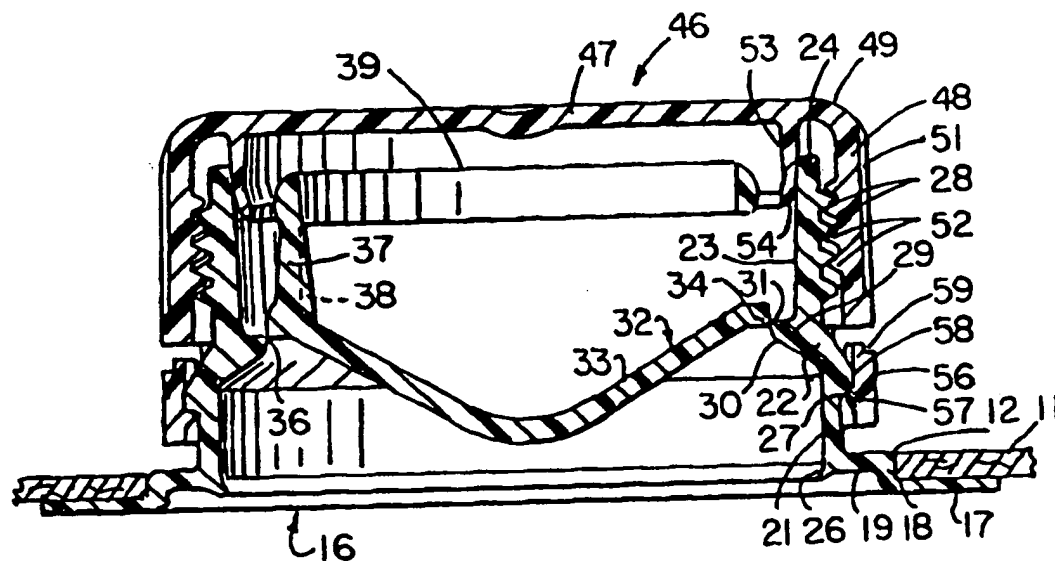


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(54) Title: FITMENT HAVING REMOVABLE MEMBRANE



(57) Abstract

A fitment (16) for use as a pour spout for a paper carton or flexible bag has a flange (17) which may be welded around a hole in the carton. A spout projecting outward from the flange is provided with a removable membrane (32) integral with an inward projection (29) positioned on the interior of the spout approximately midway of its height. Preferably, the membrane is concave. A horizontally disposed pull ring (39) is attached to the membrane by a connector (37) so that pulling the ring removes the membrane by fracturing the tear line (36) at the juncture of the outer edge of the membrane and the projection. A cap (46) snaps over the spout and may be removed by unscrewing the complementary threads (52, 28) on the cap and spout. A tamper-evidencing band (56) is frangibly connected to the lower edge of the cap skirt (48).

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## FITMENT HAVING REMOVABLE MEMBRANE

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention.

This invention relates to a new and improved fitment having a removable membrane which closes off the interior of the fitment spout. More particularly, the invention relates to a fitment which fits around and through a hole in a panel of a paperboard carton, or around a hole in a flexible container or the like, used for packaging liquids and powders and also to a closure for such fitment.

#### 2. Description of Related Art.

Fitments having membranes are shown in such patents as U.S. Patent No. 5,303,838, issued April 19, 1994, and particularly Figs. 14-16 thereof. Other patents showing membranes are U.S. Patent No. 3,458,080, issued July 29, 1969, U.S. Patent No. 4,380,303, issued April 19, 1983, and others. The present invention is an improvement on the prior art in that the membrane is located approximately midway of the height of the spout and is concave. Hence if the container on which the spout is attached is compressed, the membrane serves as a bellows to absorb such compression without danger of the membrane being detached from the spout of the fitment.

The fitment cap may be attached by downward, non-rotative motion and has a tamper-evidencing band engaging the fitment.

### SUMMARY OF THE INVENTION

The fitment of the present invention comprises a spout portion having a peripheral flange which may be welded or otherwise attached to a panel of a paperboard carton or to a flexible plastic container. A spout projects upward from the flange and, in the preferred embodiment, is externally threaded adjacent its upper end. Approximately

midway of the height of the spout is an internal membrane which is concave and is joined to an inward projection of the spout along a line of weakness. A ring is connected to the membrane in such fashion that by pulling the ring the membrane is detached from the inward projection of the spout. The concave membrane may serve as a bellows,  
5 as hereinabove explained. The concavity also facilitates the consumer gripping the ring and has certain advantages in molding the part.

The cap of the present invention has a skirt which is internally threaded to engage the threads of the spout. A lower portion of the cap has a tear band having a bead which snaps under a shoulder on the lower portion of the spout. The tear band is connected  
10 to the upper portion of the skirt by frangible means so that the cap may not be removed without giving evidence of tampering.

In one modification of the invention the cap is provided with a hollow plug depending from the top of the cap which seals against the inside of the upper end of the spout. As an alternate, the plug may be eliminated. It will be understood that after  
15 the cap has been removed and the membrane torn from the spout and a portion of the contents of the container dispensed, the cap may be used for reclosure purposes. In the alternate modification, a rib is formed on the underside of the top of the cap. When the cap is screwed back onto the spout, the rib engages the upper end of the spout to prevent leakage.

One of the features of the invention is the fact that the cap may be attached to  
20 the spout by pressing the cap downward relative to the spout, the mating threads on the spout and cap skirt slipping past each other and then interengaging. The tamper-evident band has a bead which engages a shoulder on the spout so that the cap cannot be unscrewed without severing the bridges which connect the band to the skirt and giving  
25 evidence of tampering.

### BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and form a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention:

30 Fig. 1 is a vertical sectional view through the cap and spout in assembled condition.

Fig. 2 is a side elevational view of the spout of the present invention.

Fig. 3 is a top plan view thereof.

Fig. 4 is a vertical sectional view taken substantially along the line 4-4 of Fig. 3.

Fig. 5 is a side elevational view of the cap.

Fig. 6 is a top plan view of the cap of Fig. 5.

5        Fig. 7 is a horizontal sectional view taken substantially along the line 7-7 of Fig. 5.

Fig. 7A is a fragmentary enlarged view of a portion of Fig. 7.

Fig. 8 is a vertical sectional view taken substantially along the line 8-8 of Fig. 6.

Fig. 8A is an enlarged fragmentary view of a portion of Fig. 8.

10       Fig. 8B is a fragmentary sectional view of a portion of Fig. 8.

Fig. 9 is a view similarly to Fig. 8A of a modified cap.

Fig. 10 is a schematic view showing how the fitment may be temporarily attached to the spud of an anvil of a machine for inserting the fitment into a panel of a carton.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

15        One environment in which the present invention may be employed is by attachment to a carton panel 11 having a hole 12 therein. Fitment 16 is provided with a flange 17 which is welded or otherwise attached to the underside of panel 11 surrounding hole 12. Projecting up from the inner edge of flange 17 is a step 18 having an outside dimension to fit within the hole 12 and having a height approximately equal  
20       to the thickness of panel 11. Above step 18, the fitment has an inward extending portion 19. Extending upward from the inner edge of portion 19 is lower spout stretch 21 and thereabove is an upward inward extending slanted stretch 22 which merges into a vertically extending upper stretch 23 terminating in a top edge 24.

Formed on the inside of the lower portion of lower spout stretch 21 is an inward  
25       downward slanted bead 26 having a purpose which hereinafter appears.

An external shoulder 27 is formed at the juncture of lower spout stretch 21 and slanted stretch 22 for the purpose of attachment to the tamper-evidencing band of the cap as herein after explained. On the interior of the spout at approximately the juncture of the slanted stretch 22 and the upper stretch 23 is an inward extension 29 having an  
30       upper inner corner 31. The underside of projection 29 and its juncture with lower spout stretch 21 is a curved surface 30 which facilitates dispensing the contents of the container. Projection 29 is approximately midway of the length of the spout. On the

exterior of upper spout stretch 23 are external threads 28, here shown as eight in number, of an arcuate length of approximately 270°, and of shallow pitch.

Above and inward of corner 31 is membrane 32 molded integrally with the fitment 16. The central portion of membrane 32 is concave as shown by reference numeral 33. The lower outer edge 34 of membrane 32 joins the upper inner corner 31 of projection 29 and the connection therebetween is thin and constitutes a line of weakness or tear line 36. At one portion of member 32 is an upward connection 37 reinforced by thin vertical gusset 38 and connected to horizontal pull ring 39 which is located below the level of top edge 24. When the user grips ring 39 and pulls upward, the tear line 36 breaks and the membrane 32 may be removed.

Cap 46 used with fitment 16 has a top 47 from which depends an upper skirt 48 joined to top 47 by a downwardly rounded corner 49. On the exterior of upper skirt 48 are vertical ribs which assist the user in unscrewing the cap from the fitment. Upper skirt 48 is provided with internal threads 52 mating with the external threads 28 of fitment 16. The shape of the threads is such that when the cap 46 is pressed vertically downwardly on fitment 16, the threads 52 slip over threads 28 and re-engage.

In the form of the invention shown in Fig. 1 and Figs. 5-8, a hollow plug 53 is formed on the underside of top 57, and the lower outer corner thereof having a curved edge 54 which engages the inside of upper fitment 23 in a liquid tight seal.

A tamper-evident band 56 is integrally attached to the bottom of upper skirt 48 by means of 8 angularly-spaced frangible bridge connections 61, it being understood that the number and placement of such connections is subject to variation. Band 56 is provided with an internal bead 57 which snaps under shoulder 27 when the cap is applied to the fitment. To facilitate engagement of shoulder 27, an internal groove 58 is formed in band 56 immediately above internal bead 57. An external rabbet 59 is formed on the upper outer edge of band 56. A plurality of upwardly extending bumpers 62 are formed on the upper edge of band 56 inside rabbet 59 and between frangible connections 61. Such bumpers 62 are used to keep the band 56 from collapsing when the cap is removed from the injection mold in which it is formed. Further, during assembly of the cap to the spout by a snap-on action, the bumpers reduce the tendency of the band 56 to collapse and for connections 61 to be prematurely broken. Because of rabbet 59 the consumer can more readily observe whether connections 61 are intact and thus detect tampering.

In the modification shown in Fig. 9, the plug 53 is eliminated. Formed depending from the underside of top 47<sub>a</sub> is a bead 66 considerably shorter than plug 53. It will be understood that after the cap 46 has been unscrewed from fitment 16 and membrane 32 removed, the user may wish to dispense only part of the contents of the container.

5 The upper portion of cap 46 serves as a reclosure cap. Bead 66 engages the interior of the upper stretch 23 of the spout. In other respects the modification of Fig. 9 resembles that of the preceding modifications and the same reference numerals followed by the subscript <sub>a</sub> are used to designate corresponding parts.

Directing attention to Fig. 10, automatic equipment for welding the fitment flange 17 to the underside of panel 11 is known in the art. In one form of such equipment an anvil 71 has a flange 72 to which is attached a spud 73 which picks the fitment off of a chute (not shown) by fitting inside the lower spout stretch 31. The lowest portion of the concave area 33 of membrane 32 is above the upper edge of spud 73. In the form of the invention shown in Fig. 10, spud 73 has an external diameter such that

15 when it is inserted through the lower end of the fitment 16 the inner bead 26 frictionally engages the exterior of spud 73. The spud is formed with a concavity 74 so as not to conflict with the concavity 33 of membrane 32. Holes 76 in spud 73 relieve any vacuum which might tend to impede release of fitment 16 from spud 73 when the fitment has been positioned in the carton panel 11, as shown in Fig. 1.

20 Reference will now be made in detail to the preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. While the invention will be described in conjunction with the preferred embodiments, it will be understood that they are not intended to limit the invention to those embodiments. On the contrary, the invention is intended to cover alternatives, modifications and

25 equivalents, which may be included within the spirit and scope of the invention as defined by the appended claims.

The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed,

30 and obviously many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, to thereby enable others

skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the Claims appended hereto and their equivalents.



**WHAT IS CLAIMED IS:**

1. A fitment for use surrounding a hole in a container wall comprising an annular flange dimensioned to be adhered to said wall surrounding said hole, a spout projecting outward from said flange having an inner and an outer wall, a  
5 membrane integral with said spout and closing off said spout having a peripheral edge joined to said inner wall along a circumferential line of weakness, a pull tab disposed above said membrane, a connector between a point on said tab and a point on said edge of said membrane.
2. A fitment according to Claim 1 in which said membrane is concave.
- 10 3. A fitment according to Claim 1 in which said inner wall is formed with an inward projection and said peripheral edge is joined to said projection.
4. A fitment according to Claim 3 in which said projection has an upper inner first corner and said edge of said membrane has an outer lower second corner, said second corner being disposed above and inward of said first corner and joined  
15 thereto at said line of weakness.
5. A fitment according to Claim 1 in which said pull tab comprises a ring.
6. A fitment according to Claim 1 which further comprises a vertical gusset on said connector, said gusset being narrower than said connection.
- 20 7. A fitment according to Claim 1 which further comprises spud engaging means on the interior of said spout below said membrane to engage a spud on external apparatus for attaching said fitment to said container wall.
8. A fitment according to Claim 1 in which said spout is formed with cap-engagement means and which further comprises a cap comprising a top and  
25 a depending skirt having spout-engaging means to detachably engage said cap-engagement means.
9. A fitment according to Claim 8 in which said cap- engagement and said spout-engagement means are formed and dimensioned so that said cap may be applied to said fitment by a straight downward, non-rotative motion.
- 30 10. A fitment according to Claim 8 in which said cap-engagement means are external of said spout and said spout-engagement means of said skirt are internal.
11. A fitment according to Claim 8 in which said cap-engagement and said spout-engagement means comprise mating threads.

12. A fitment according to Claim 8 in which said cap further comprises a tamper-evidencing band below said skirt, frangible means connecting an upper edge of said band to a lower edge of said skirt and second spout-engaging means on said band and in which said fitment further comprises band engaging means positioned and dimensioned to engage said second spout-engaging means so that said cap cannot be removed from said fitment without fracturing said frangible means.

13. A fitment according to Claim 12 in which said frangible means comprises angularly spaced bridge connections.

14. A fitment according to Claim 12 in which said second spout-engaging means comprises an internal bead and said band engaging means comprises an external projection on said spout having an underside formed as a shoulder, said bead locking under said shoulder.

15. A fitment according to Claim 12 which further comprises third spout-engaging means on the underside of said top shaped to seal with said inner wall of said spout.

16. A fitment according to Claim 15 in which said third spout-engaging means comprises a hollow plug.

17. A fitment according to Claim 15 in which said spout engaging means comprises a bead engageable with said spout upon reclosure of said cap on said spout after initial removal of said cap from said fitment.

18. In combination, a fitment according to Claim 1 and a container having an inner and an outer surface, said flange adhered to said inner surface surrounding said hole, said flange being formed with an inner edge and a step extending upwardly of said inner edge out through said hole and means joining said step to said spout.

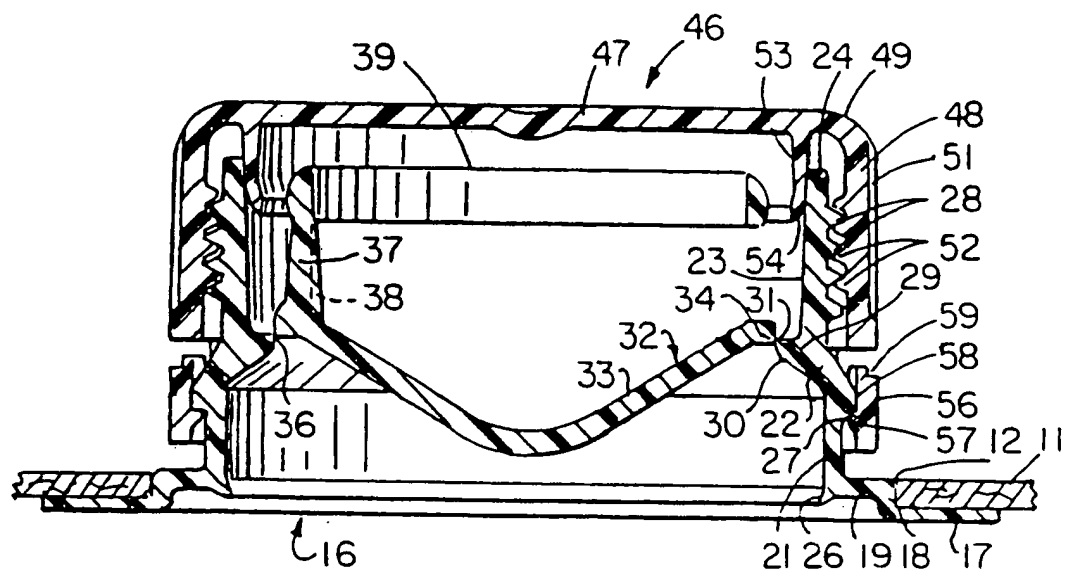


FIG. 1

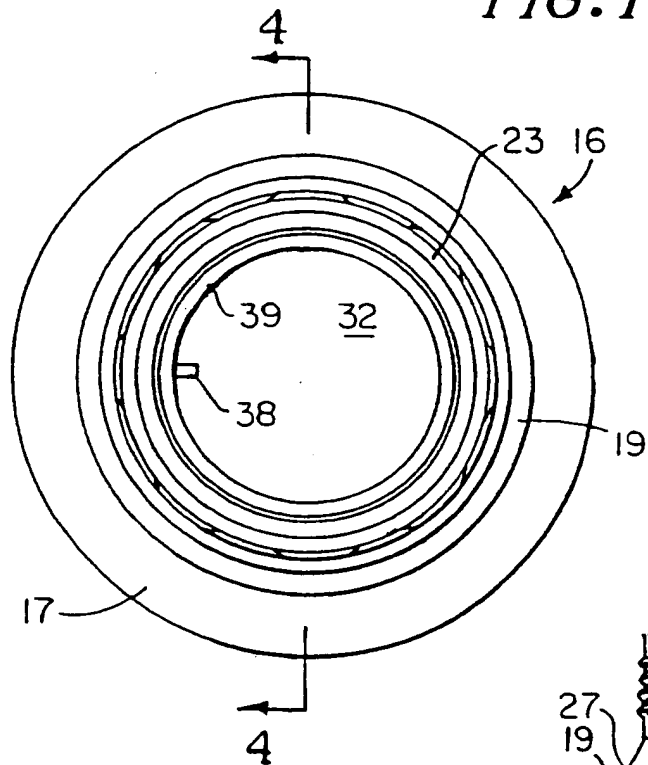


FIG. 3

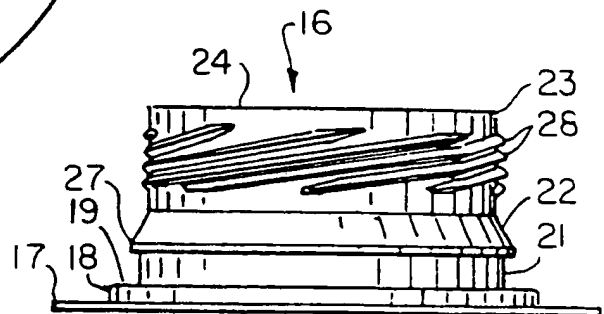


FIG. 2

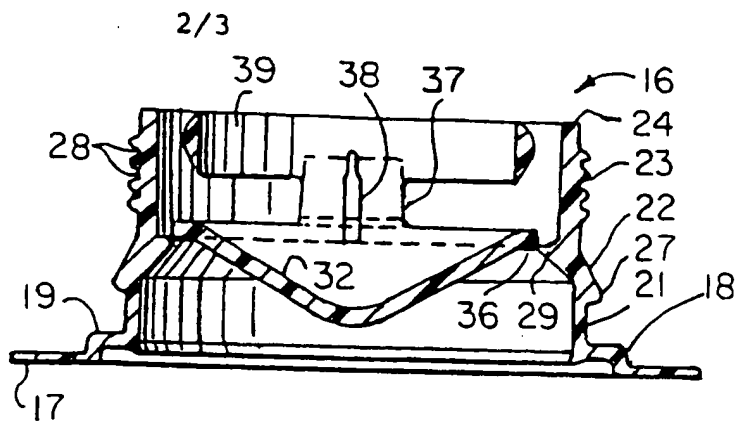


FIG. 4

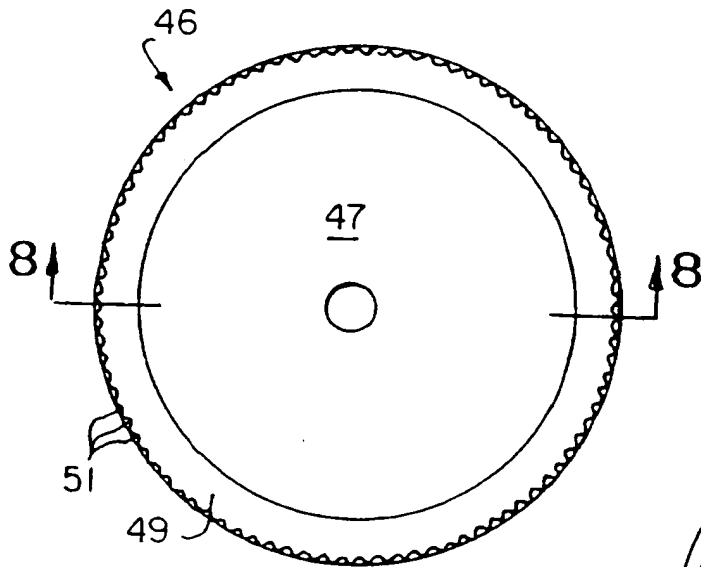


FIG. 6

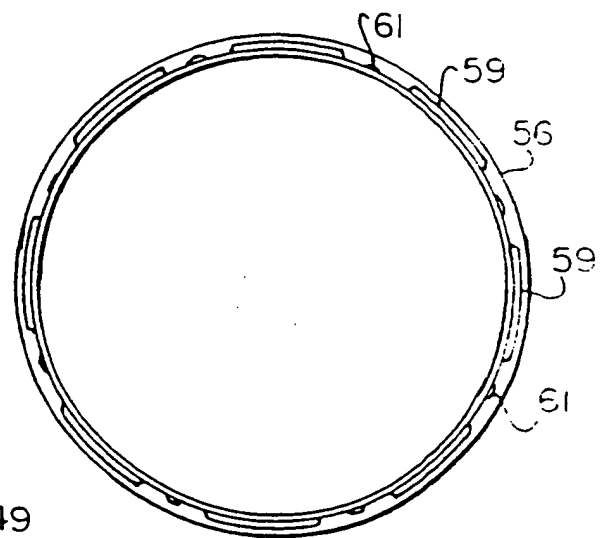


FIG. 7

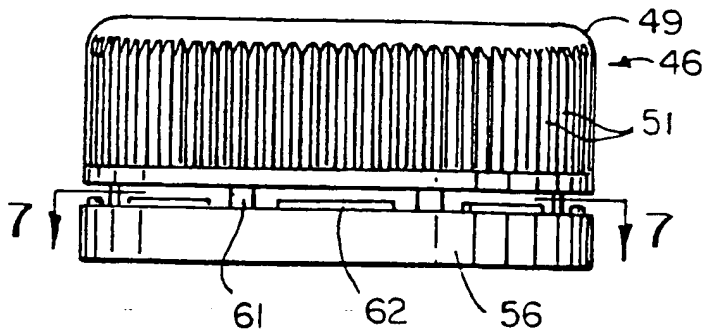


FIG. 5

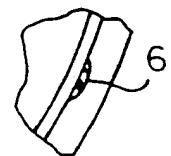


FIG. 7A

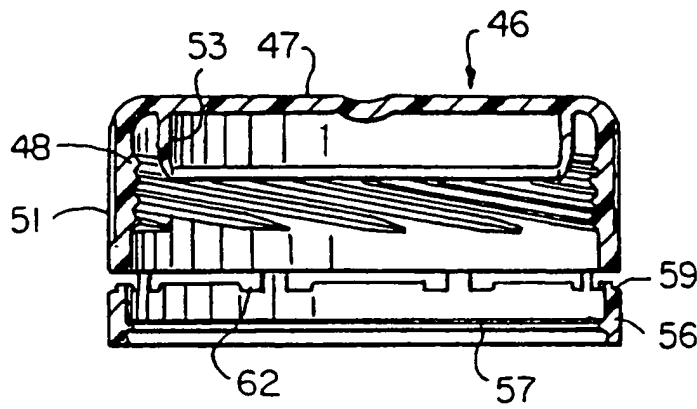


FIG. 8

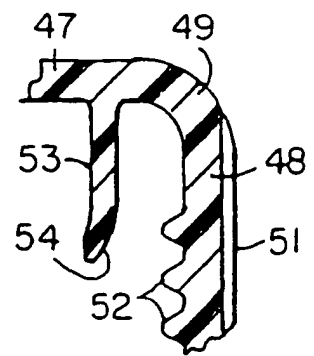


FIG. 8A

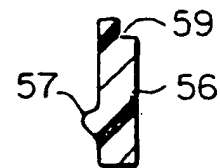


FIG. 8B

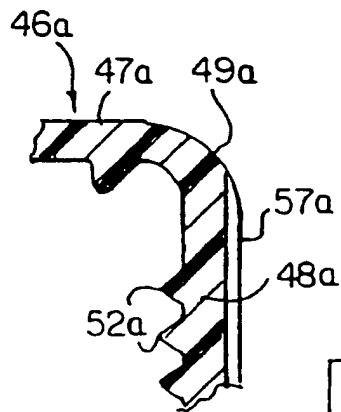


FIG. 9

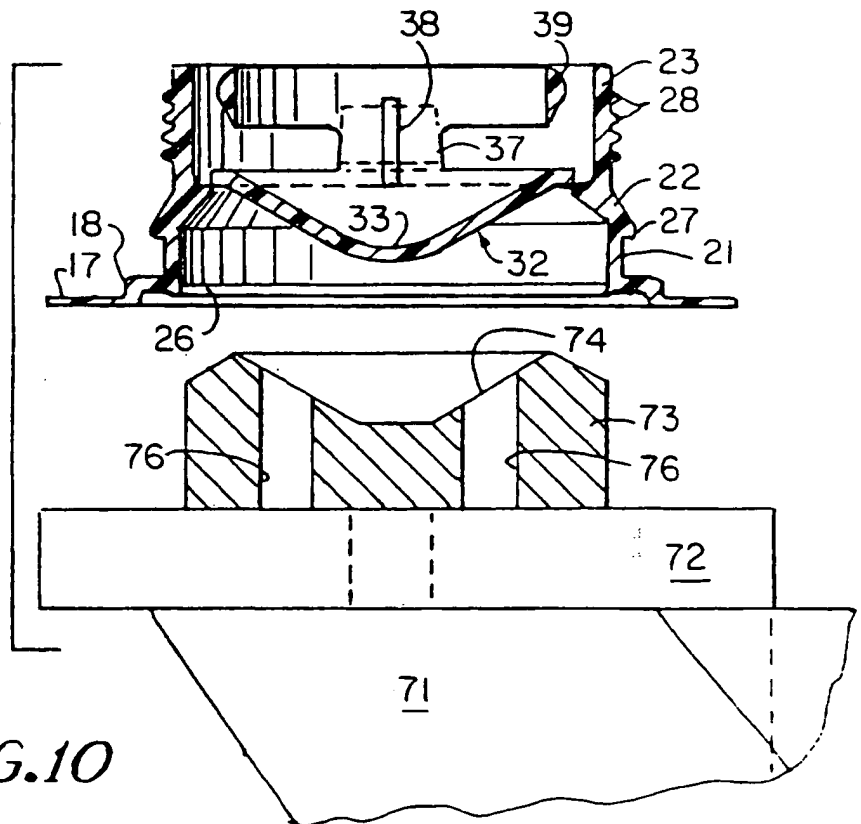


FIG. 10

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(6) :B65D 17/34, 47/10, 53/00

US CL :Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 229/125.15, 125.04, 125.05; 222/541.9; 220/258, 269, 270, 359, 465; 215/44, 45, 318, 232, 341, 343, 344, 250

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US, A, 5,176,300 (KISHIKAWA, ET AL) 05 JANUARY 1993. SEE ENTIRE DOCUMENT	1,3,5,7,8, 10,11,18
Y	US, A, 5,301,849 (GUGLIELMINI, ET AL) 12 APRIL 1994. SEE FIGURE 2.	2
Y	US, A, 4,746,025 (KRAUTKRAMER, ET AL) 24 MAY 1988. SEE ENTIRE DOCUMENT.	4
Y	US, A, 4,850,503 (LARSSON) 25 JULY 1989, col. 3, lines 13-15.	6
Y	US, A, 4,625,875 (CARR, ET AL) 02 DECEMBER 1986. SEE ENTIRE DOCUMENT.	9,12-16
Y	US, A, 3,223,269 (WILLIAMS) 14 DECEMBER 1965. SEE ENTIRE DOCUMENT.	15

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document published on or after the international filing date "L" document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "Z" document member of the same patent family
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Date of the actual completion of the international search

22 MARCH 1996

Date of mailing of the international search report

09 APR 1996

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